ROCKS and MINERALS

PUBLISHED MONTHLY

Edited and Published by PETER ZODAC

NOVEMBER 1939

Contents for November, 1939

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Entered as second-class matter September 13, 1926, at the Post Office at Peekskill, N. Y., under the Act of March 3, 1879.

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Specially written articles (as contributions) are desired.

Subscription price $2.00 a year; Current numbers, 25c a copy. No responsibility is assumed for subscriptions paid to agents and it is best to remit direct to the Publisher.

Issued on the 1st day of each month.

Authors alone are responsible for statements made and opinions expressed in their respective articles.

ROCKS and MINERALS PEEKSKILL, N. Y., U. S. A.

The Official Journal of the Rocks and Minerals Association

Chips from the Quarry

PETER ZODAC

A COLLECTOR SHOWS HIS CREDENTIALS

A letter arrived recently from a collector desiring to know in what way the Rocks and Minerals Association assists a member who may want to visit a mine or a quarry for the purpose of collecting minerals. The Association helps in many ways. Sometimes superintendents of mines and quarries are members of the Association who often go out of their way to help fellow-members who may call on them. The Association, itself, however, carries tremendous weight and it is recognized, esteemed and respected all over the world. Mines and quarries are not barred to mineral collectors as a rule but they are barred to curiosity-seekers or to individuals who have no business around the workings.

The average mineral collector is a respected individual who is often welcomed at mines and quarries. Because of his knowledge of minerals and localities, he can be of great aid to mining and quarry officials either in identifying unknown speicmens in their offices or telling them where minerals or ores typical to those worked by them are present in their section of the country or elsewhere. Even though a mineral collector can be of no aid to a mine or quarry he is neverthleless sincerely and scientifically interested in the minerals that occur there and so are the superintendents. Consequently two individuals having similar interests are bound to be attracted to each other.

However, how is a superintendent to know that you are a mineral collector? Anyone can say he is a mineral collector simply to gain admission to a mine or quarry. An American traveling abroad needs a passport; a mineral collector visiting mines or quarries needs the Association membership card. Let us quote the actual experience that befell Mr. John A. Ryan, of Torrington, Conn.

Not long ago Mr. Ryan was in Canada on business (Mrs. Ryan accompanied him) and having a few days at their disposal they made a special trip to a noted gold mine in Ontario for the purpose of collecting a few minerals off the dumps. They naturally stopped at the mine office, on their arrival, to obtain permission to collect but were turned down—visitors were not allowed on the property. In vain did Mr. Ryan plead that they were from the States, that they had made the long trip of 150 miles simply to acquire a few specimens from the dumps to add to their collection. Just as they were about to leave, terribly disappointed, Mr. Ryan happened to think of his Rocks and Minerals Association membership card, which luckily for him was in his pocket. It

(Continued on page 356)

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PUBLISHED MONTHLY

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NOVEMBER 1939

Vol. 14, No. 11

The Official Journal of the ROCKS and MINERALS ASSOCIATION

Whole No. 100

MORE ABOUT MINERAL COLLECTIONS AND COLLECTING

By MARY S. SHAUB
Northampton, Massachusetts

The beginning of mineral collecting probably antedates that of any other hobby. Yet there are about as many ideas concerning collections and collecting as there are collectors. In the May and July numbers of *Rocks and Minerals* the Editor presented some views concerning mineral collections which are indeed worthy of consideration. However, there are some additional points that might well be considered by the average mineral collector.

Mr. Zodac's suggested slogan, "Nothing but the best should go into my collection", is probaby not intended to be taken too literally for there is only one "best" of each mineral species. What a lively time any designated judges would have in deciding which specimen is the best!! We all instinctively want the best specimen within our means whether it is acquired through purchase or by industriously searching the dumps or by trading.

The institution of trading has many desirable angles. It provides a means of reducing surplus specimens from local mineral deposits and acquiring some one's surplus from remote localities and even foreign countries. It provides a means of getting acquainted with other collectors whether personally or through correspondence.

There is one disadvantage in trading and that is for unscrupulous collectors (it is fortunate that the number in this class is low) to return inferior material for good specimens. Nevertheless, this practise can be reduced to a minimum by limiting the size of consignments until the character of the exchanged material is known.

Mineral collections may be considered as belonging to one of six general groups.

1. The usual showy exhibit of mineralogical museums.

2. The collections of individuals which include the best specimens of as many different mineral species as are obtainable with available means.

3. Gems and precious stones which include a wide range of mineral substances depending upon the fancy of the individual.

4. Collections having special properties, i.e. fluorescence, phosphorescence, or crystallographic features.

5. Collections aimed to include all the minerals occurring in any particular deposit, group of deposits or particular area. A *complete* suite of minerals from Franklin and Sterling Hill, New Jersey, would be one of which

any collector would be justly proud, even though many of the species would be represented by the merest bit of seemingly uninteresting-looking material. This would be true also of a complete collection of minerals from the cavities in the trap rocks of New Jersey or of the Connecticut Valley as well as from any other noted locality. Mineral clubs may assist their members by building up *complete* collections of the minerals from the deposits in the vicinity of their headquarters. Such collections would not only by valuable to anyone visiting the area but they would be a guide for the younger members of the clubs on which to base their collecting.

The collection designed to include as many minerals as possible from any given deposit or area is the one which will probably do more for the average mineral collector and the science of Mineralogy than any other. In the first place it gives "life" to a collection for no one knows what minerals may appear on the next visit to the favorite quarry or that old picked-over dump of the past century. The entire suite may be changed many times during the collector's life as better specimens are discovered from time to time. Eventually they may become the basis for a scientific study of the particular deposit. Such a collection does not call for critical comparisons with specimens of the same species from other localities in order to ascertain whether the collector has acquired the "best" specimen. Specimens of locality minerals as well as all others should, of course, be clean and free from bruises and contain as many of the species in *well-developed crystals* as possible even though the crystals are small. Indeed it is the minute crystals that occur in the small cavities that are often the most interesting and valuable scientifically. Who knows when the amateur may be incidental in making contributions directly or indirectly to mineralogy.

Behind the scenes in the mineralogy laboratories it is not the showy minerals that are the objects of intense study, but rather the small crystals which yield most of the important scientific data concerning any mineral species. There are many minerals which lack good crystal speicmens for a complete study of the species. The amateur collector who diligently searches for good crystals may be among those who can supply minerals for which data are lacking and thus contribute materially to the science of Mineralogy, or he may bring a new mineral to the attention of scientific workers.

6. Mirco-mounts. There appears to be a lack of interest or appreciation among the thousands of mineral colectors for this type of collection, i.e. the small cavity minerals known as micro-mounts. The probable reason for this is that it is almost necessary for the collector to possess a microscope to view the specimens. However, a good 14 magnification hand lens will go a long way in bringing these beautiful specimens within the vision of most people.

The collecting of small cavity crystals or micro-mounts is a field in which more amateur collectors should be interested for the expense of building up a large collection from many parts of the world is much less than for the usual size cabinet specimens. The cost of transporting several dozen specimens suitable for micro-mounts for a long distance would not be beyond the means of the avearge collector. The cost of suitable standard mounting boxes is relatively low in comparison with cabinets for the same number of large specimens. Might it

not be a happy venture for *Rocks and Minerals* to devote periodically a few pages to this interesting phase of mineralogy and thereby encourage exchanges of micro-crystals between subscribers both in this country and abroad. Once an interest is developed more mineral dealers will add micro-mounts to their stocks and use the facilities of the magazine to bring dealers and collectors together.

There is little doubt that micro-mounts would be a popular phase of mineral collecting. When persons, who are accustomed to seeing only cabinet specimens, have an opportunity of looking at the small micro-crystals under the low power binocular microscope, they are greatly surprised and inspired at the beauty and perfection of form of these small minerals.

To the amateur collector micro-mounts should open up a very fascinating and instructive field of mineralogy. The collecting of such minerals may appear to many collectors as an impossibility because of the cost of a microscope. This, however, may not be the case for one can start such a collection with a small hand lens and several dozen boxes for mounting. At a later date a second-hand microscope can be obtained for less than many beginning collectors spend for other things having less genuine and lasting interest.

RECENT ACQUISITIONS OF THE AMERICAN MUSEUM OF NATURAL HISTORY

A number of unusually fine cut gems have recently been added to the gem department of the American Museum of Natural History, New York City, and are on display in the mineral hall. Among the new gems, some of which are unusually interesting due to their rarity, are:

Danburite. An emerald-cut stone of 13 carats from Burma.

Spinel. Pinkish, having somewhat the color of rubellite, 12½ carats. From Burma.

Wernerite. A pink gem of 9.70 carats from Brazil.

Topaz. Salmon color, 241.43 carats, from Brazil.

Rose Quartz. An asteriated ball which gives a reflected asterism—an unusual phenomena. From Brazil.

Euclase. A light green gem stone of 3 1/3 carats. From Villa Rosa, Brazil.

Harlequin Fire Opal. A lovely stone of 126 carats from Queretaro, Mexico.

Vesuvianite. An unusual gem stone, brown in color 4½ carats weight, displayed with a large rough specimen. From Laurel, Quebec, Canada, a new locality for vesuvianite.

Among minerals newly acquired by the Museum are:

Morganite. A good size rough piece, deep rose-red in color of gem quality. A fine specimen from Antis Rabe, Madagascar.

Aquamarine. A fine gem crystal about 2½ inches in length from a new locality, Brinagar, Kashmir, India.

Gold. A crystallized specimen of outstanding quality and value; said to be one of the finest in the United States. From the Red Ledge Mine, Nevada County, Calif.

BUREAU OF MINES SURVEYS STRATEGIC USES OF SHEET MICA

By PAUL M. TYLER, Chief Engineer,
Nonmetal Economics Division U. S. Bureau of Mines

Mica serves many useful purposes some of which are extremely important from the standpoint of national defense, according to the Bureau of Mines, United States Department of the Interior. This is particularly true of the higher grades of sheet mica. Without adequate supplies of this indispensable mineral commodity the Army and Navy would be handicapped seriously because our modern means of rapid communication by telegraph, telephone, or radio would fail to give warning of the advance of armies, ships, or enemy planes, and much of our electrical equipment would be unserviceable. By using splittings pasted together and built-up sheets and board, we have eked out our needs for mica in the electrical industry, but natural sheet mica still has no substitute for many of its uses. The radio industry is the leading consumer of sheet mica, though relatively large quantities are still employed in electrical equipment and appliances in important little places wherever built-up mica cannot do the job.

Military authorities list mica as a strategic material. Domestic mines in North Carolina, New Hampshire, Connecticut, and South Dakota may be depended upon to supply a good deal more mica than they do now, but probably never enough for our needs —particularly of certain special kinds.

One of the largest uses for sheet mica (excluding splittings) is for radio tube bridges and supports. Virtually all tubes used in receiving sets contain from two to four small pieces of mica, which serve to hold the filaments apart and keep the whole assembly rigid and away from the outer walls. Most of the mica so used is small, being punched from irregular sheets less than two square inches in area. The manufacture of these small stampings affords employment to several hundred people, but the total quantity of mica required probably never exceeds about 800,000 pounds a year, often less. Moreover, only one-third of this mica emerges as stamped products, and the remaining two-thirds as cuttings, which cannot be used for any purpose except the manufacture of ground mica used chiefly for coating roofing material to prevent sticking in the roll. This waste is worth only about three-quarters of a cent a pound whereas the irregular sheets of mica, before stamping, cost on the average 40 cents a pound. The finished pieces vary greatly in design and in size so that as many as 1,200 or as few as 40 would weigh an avoirdupois ounce. The most popular size for this use is what is known as No. 6 mica, although occasionally the next larger size, No. 5 may be used; it is chiefly of medium quality, known as good-stained.

The electrical appliance field takes a somewhat larger range of sizes. Electric mica, so-called, is chiefly the quality known as black-stained, which is somewhat less expensive than the good-stained material used in radio tubes. Probably 75 percent of the mica used in household appliances is of domestic origin, and we could become self-sufficient in respect to this material if need arose—partly by increasing production and partly by eliminating non-military uses such as household cooking appliances. In respect to radio mica, savings also could be

made, particularly in household sets, although such savings might be offset to some extent by the expansion of necessary communications.

There are other fields, however, wherein the Bureau of Mines anticipates that war emergency would increase our requirements in mica, and, unfortunately, it is these uses that require the highest qualities of mica, which we definitely cannot produce in anything like sufficient amount in the United States. From a military standpoint supplies of mica for making condensers and spark plugs are especially important.

Many materials are used as dielectrics, but mica is the best for many purposes, particularly in radio condensers. Three kinds of condensers are used in radio work—transmitting, receiving, and trimmer types. Only the best grades of mica can be used in transmitter condensers. Trimmer condensers also use a fine quality of mica, but mostly small sizes which are cheaper and easier to get. For both these purposes virtually clear or fair-stained mica is needed, but for condensers for ordinary radio receiving sets the somewhat poorer "good-stained" quality can be used. Practically all mica used for all types of mica condensers is imported, principally from India. A canvass by the Bureau of Mines shows that in 1937 the United States used approximately 170,000 pound of mica for condensers, most of which, around 105,000, was for radio receiver condensers. The comsumption for transmitting condensers was roughly 30,000 pounds, and for trimmer condensers, 20,000 pounds. Included in the total was at least 15,000 pounds of mica used in condensers for magnetos and other commercial purposes. Consumption in 1938 was less due to the business recession, but the trend is upward and war emergency might boost it 50 to 100 percent.

Mica for use in all kinds of condensers must not only be a good insulator and possess high dielectric strength, or break-down resistance, but also must have a low-power factor. Power factor is an invisible quality that varies greatly in different types of mica, but is extremely important in condenser work. It represents the amount of power lost in the condenser, and a low-power factor is essential not merely to obtain a high efficiency in initial use, but because power losses in a condenser are converted into heat which further impairs the efficiency and so builds up until the condenser burns out. Of the 170,000 pounds or more of rough block mica used in 1937 for the manufacture of condensers, about 130,000 pounds was fair-strained or better, and 40,000 pounds was good-stained quality. All of the latter was used in receiver condensers and was No. 6 size. Most of the fair-stained mica, almost 50 percent, also was used in receiver condensers. The remainder of the fair-stained, as well as all the clear and slightly-stained mica, was used in transmitter and trimmer condensers. As regards size, the fair-stained and better-grade mica was divided roughly into 55,000 pounds No. 6, 35,000 pounds No. 5½, 30,000 pounds No. 5, and 10,000 pounds of No. 4½ or larger. A small amount of size No. 4 or larger was used in magnetos and miscellaneous commercial condensers. Very little mica of condenser quality can be obtained for less than $1.25 a pound, and material for some purposes costs upwards of $5 a pound. In other words, this condenser mica costs from three to five times as much as radio mica and almost ten times as much as ordinary electrical mica of similar size.

Ordinary spark plugs such as are used in automobiles are unsafe in airplane work or for other services where their cores might be cracked by the splash of oil or rapid changes in temperature. In a typical mica spark plug, the center wire or electrode is insulated by a wrapping of thin sheet mica known as a "cigarette", outside of which mica washers are fitted and pressed tightly together. The washers that go inside of the engine cylinder, exposed to the full heat of the explosion, are generally made of phlogopite or amber mica, which has to be imported from Canada or Madagascar. Those in the cooler part of the plug, however, are muscovite and can be made from sizes small enough so that their procurement affords no serious supply problem, even in war time. The four manufacturers of spark plugs in 1937 reported to the Bureau of Mines a consumption of 12,580 pounds of fair-stained mica of cigarette quality and 9,725 pounds of amber mica for nose washers. Unless ceramic or other types of spark plug cores can be further perfected, however, war-time needs would be much greater. To make a thousand spark plugs, at least 11 pounds of high-grade mica are needed for cigarettes, the Bureau of Mines finds, and this figure must be increased to 16 pounds or more to cover the need for similar quality mica for shielded sleeve linings on such proportion of the plugs as are made with this added feature. In terms of rough block mica, the figure may be as high as 45 pounds, including waste. Cut mica for spark plug cigarettes is worth at least $2.50 a pound and some manufacturers pay $7 a pound. For nose washers the consumption of phlogopite is of the order of 20 to 25 pounds per thousand plugs. The best estimate of our war-time needs is 25,000 to 50,000 pounds of cigarette mica, worth on the average at least $3 a pound, and a similar quantity of small amber mica for making spark plug washers and valued at, say 70 cents a pound which probably can be had from Canada if Madagascar supplies were cut off. For top washers, around 20,000 pounds of muscovite are needed, but this offers no serious procurement problem as it can be obtained domestically or from South America.

We are virtually dependent upon British India for our high-grade condenser and spark plug cigarette mica. It would seem quite impossible to attempt to cover any large proportion of our needs of such mica from domestic or other foreign mines. Even in British India not more than 10 percent of the sheet mica mined comes up to the rigid requirement of such material. Moreover, in India, the opportunity for selection is far greater than it would be under American conditions, because in that country the mica is given far more careful inspection in the mines. Skilled labor is cheap, and the small books of mica are repeatedly handled and examined during the laborious process of sorting and manufacturing mica films and splittings. In the splitting operation, as leaf after leaf is removed, stained or spotted laminae are laid bare and can be eliminated and sold separately. In the United States only about one-fifth as much sheet mica is mined as in India, no splitting is done ,and even the trimming is far less complete because more irregular pieces can be marketed.

It is almost impossible to account for the total consumption of mica by industries because of the tremendous waste in manufacturing and because block mica from some mines is trimmed much more closely than mica

from other mines. To make domestic production figures comparable with imports, a 35 percent deduction is indicated in respect to smaller sizes (punch and circle mica) and 10 percent in respect to larger sizes. Moreover, since imports are divided according to price rather than size, some further assumptions are necessary in order to calculate apparent supplies available each year. However, the Bureau of Mines estimates that the consumption of raw sheet or block mica in the United States in 1937, the most active year, totalled about 2,600,000 pounds which was distributed approximately as shown in the accompanying table.

Estimated Consumption of Sheet Mica in the United States in 1937 by Uses

Use	Quantity	Usual Quality	Typical Size
	Pounds		
Transmitter condensers	30,000	Fair-stained or better; films, block	#5½ (mostly),5,4
Trimmer condensers	20,000	Fair-stained films, block	#6
Receiver condensers	105,000	Fair-stained (60%); good-stained	#6
Industrial condensers, magnetos	15,000	Mostly fair-stained	#6 (75%);5,4,3,2
Spark plug cigarettes and shields	12,600	Fair-stained block, slightly stained films	#4 and larger
Spark plug washers—amber	10,000	Phlogopite	#5
Spark plug washers—muscovite	20,000	Good-stained	#5
Radio tube parts	750,000	Good-stained	#6 (85%);5½, 5
Washers, small stampings	1,127,400	Domestic (75%), stained	Punch, circle, 6#
Electrical appliances, etc.	500,000	Domestic (50%), stained	Various
Miscellaneous	10,000	Mostly good-stained or better	Various
	2,600,000		

Note: Eestimates for the first eight items covering most of the high-grade mica are based upon reports from manufacturers and are probably at least 80 percent correct. The last 3 items are added to account for the total estimated consumption of block mica and thick films as indicated by available data for domestic consumption and imports. Built-up mica and splittings are covered in another tabulation. In addition there were imported in 1937, 138, 773 pounds of manufactured mica (cut or stamped o dimensions) equivalent to probably 300,000 pounds of block mica. In calculating the total apparent consumption as shown by this table, the domestic production of punch and circle was reduced by 35 percent and of larger sizes by 10 percent to make it comparable with imported block mica which is closer trimmed.

Of the total apparent consumption of 170,000 pounds of mica in condensers of all kinds, about 40,000 pounds was good-stained (#6); the remainder (chiefly fair-stained) comprised 55,000 pounds #6, 35,000 pounds No. 5½, 30,000 pounds No. 5, and 10,000 pounds of larger sizes, up to #2.

NO MINERAL DEALERS IN CHICAGO

A collector from Illinois, on a recent visit to the offices of Rocks and Minerals, lamented the fact that there is no mineral dealer in Chicago. This seems quite strange. With millions of people in and around Chicago, it would be supposed that at least one mineral dealer would be established in that area. There are no mineral localities around Chicago, although in the city is a large and fluorishing mineral society — Marquette Geological Association—so that every collector is forced to make long trips if he wants to do any collecting.

It is all right and good to buy specimens by mail from dealers residing at long distances but it is much better to actually see the material before buying. Here is an opportunity for some energetic collector in Chicago to branch out as a dealer.

HEULANDITE: MOST COLORFUL ZEOLITE?

By WALTER P. SACHS

Although color frequently is an unreliable aid to the identification of a mineral species and, as a consequence, has fallen into disuse as a diagnostic property, to the layman or mineralogical amateur there are few qualities more impressive. The wide variation in mineral colors and the depth or delicacy of shades or tints are a constant visual pleasure.

Recently having acquired, as part of a collection, a superb assemblage of heulandites gathered personally for the most part by Ernest H. Wilson, of Caldwell, New Jersey, the writer immediately was captivated by the diversity of tints and shades in the species. The data in this article are the result of a study of sixteen of the heulandites showing probably the greatest range in color of any of the zeolites in the collection. While many of the zeolites are from Paterson, this inquiry has been limited to the heulandites which came from the old Francisco quarry in Great Notch, N. J. Now abandoned as a source of trap rock, the quarry in its heyday produced many outstanding specimens, some of which, in all likelihood, may never be duplicated.

The colors, as determined, may chiefly be useful from a comparative viewpoint to show the extent of the differences in coloring since they are close-approximations according to only one person's color sense. It is to be noted that these colors do not constitute the streak; rather they are the apparent or perceptible colors. Probably it is the difficulty in evaluating these colors, the paucity of precise, standardized methods of comparison, that results in their waiver by mineralogy as probative properties. But in any event, in the case of heulandites from Great Notch, they are of rare beauty.

The variations in color are presented after macroscopic comparison with the plates in *Color Standards and Color Nomenclature* by Robert Ridgway which provides some 1,100 named colors.

Specimen Number	Color Name	Color or hue No.	Tone
438/10	Jasper Pink	3′	d
438/72	Seashell Pink	11′	f
438/29	Deep Vinaceous	1″	b
438/76	Pale Vinaceous	1″	f
438/27	Pinkish Vinaceous	5″	d
438/59	Pale Vinaceous-Pink	9″	f
438/30	Light Pinkish Cinnamon	15″	d
438/57	Ivory Yellow	21″	f
438/108	Pale Olivine	35″	f
438/38	Eupatorium Purple	67″	—
438/83	Citrine-Drab	21‴	i
438/106	Avellaneous	17″	b
438/25	Wood Brown	17″	—
438/26	Buffy Brown	17‴	i
438/28	estimated	17‴	j
438/35	colorless	—	—

Since the heulandite crystals show a variation in tone between the faces exhibiting a vitreous luster and those showing a pearly luster, the comparisons were accomplished uniformly with the vitreous-luster surfaces and, as far as possible, with a constant illumination.

It is to be observed that most of the colors named are *tints* (i. e., colors weakened by high illumination or by admixture of white) rather than *shades* (i. e., colors darkened by shadow or by admixture of black). In only two cases (specimens number 438/38 and 438/25) did the colors approximate a *hue* (i. e., a color lying between a contiguous pair of spectrum colors). In only three cases (specimens number 438/83, 438/26 and 438/28) did the colors descend to a

shade and in each of these cases, the shades were near the hues. These facts are cited to indicate the delicacy and softness of the colors which are also mostly "warm" colors (i. e., nearer the red end of the spectrum).

All of the heulandite colors determined are broken colors (i. e., spectrum colors or hues dulled or reduced in purity by admixture of neutral gray). Ridgway says of broken colors: "These * * * are far more numerous in Nature than the pure spectrum colors."

Heulandite was named for the English mineralogical collector, H. Heuland, whose cabinet was the basis of the classical work (1837) of Levy (Dana, 1903). It was first distinguished from stilbite by Brooke and so named by him "in compliment to Mr. Heuland, to whom for many years British mineralogists have been so much indebted" (Greg and Lettsom, 1858).

In more than a century since it was first described as a distinct species, mineralogical literature has attributed many colors to heulandite, but of all the references available to the writer no single one lists the variety of colors apparent in the Great Notch heulandites. Thus, Comstock (1832) says: "Colours, white, yellowish white, brownish, red, and sometimes colourless." Nichol (1849) lists: "Colourless, white, but often coloured, especially flesh or brick red, and yellowish or hair brown." Greg and Lettsom (1858) give: "Colourless, white, but frequently coloured, especially flesh-red to tile red, also occasionally yellowish-gray to hair brown and olive brown." Miers (1902) says: " * * * sometimes colourless or white, but sometimes red xxx." Dana (1903) says: "Color various shades of white, passing into red, gray and brown." Phillips (1912) gives: "Color, white, gray, brown, or brick red." Bayley (1917) says: "It is colorless, white, yellow, brown, pink or red."

Perhaps some other investigator can augment the range of heulandite colors, but viewing the present wide variety of coloring indicated by the literature and this study, the writer tentatively puts forth the nomination of heulandite for "the most colorful of the zeolites".

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Many interesting minerals are being brought to light in the excavation of shafts and tunnels for the New York City Water Supply that is now going on. At Shaft 8, near Fahnstock Park, Putnam County, N. Y., fine masses of magnetite are plentiful in pinkish microcline. Some very interesting banded colored gneiss have also been found at this shaft.

Members who may find interesting or rare minerals on any of their trips to localities are urged to report them to ROCKS AND MINERALS. All items worthy of notice will be printed in the magazine. Have your finds recorded!

SOME CAVES OF THE HUDSON VALLEY, N. Y.

By PETER ZODAC
Editor Rocks and Minerals

In the lower Hudson Valley of New York State, four types of caves have been found by the writer. The most common are those found on the talus slopes of mountains and were formed by huge though often thin slabs of rocks resting upon a number of small masses of odd-shaped rocks forming one or a series of small "caves". The slabs, broken off their parent bodies further up the slope, slid down and came to rest where they are now found. Perhaps the most noted cave of this type around Peekskill is the one occurring on the northern slope of Spitzenberg Mountain, two miles south of the city in the Blue Mountain Reservation. This "cave" may be about 15x12x5 ft. high. Another and a most interesting cave of this type is the "money hole" which is located about three-quarters of a mile east of Nelson Corners on the Albany Post Road (8 miles north of Peekskill). It is approximately 30x30 feet in area from 4 to 7 feet in height and is entered by a 3 foot opening which has a vertical drop of 15 feet. The slab consists of granite, pegmatite and gneiss resting on gneiss. According to Dr. G. P. Wygant, a historian of Peekskill, the cave was used as a den by a counterfeiter, one Henry Holmes, around 1820. A farmer, while hunting for his cattle that had strayed away during the night, discovered the opening to the cave, found out what was going on and reported the matter to the authorities. Holmes was arrested and sentenced to seven years imprisonment. The cave is in a wild section of country and at the time of the writer's visit to it, Tues., Oct. 25, 1938, not a thing of interest could be found inside of it.

The second type is the true cave occurring in limestone and was formed by the dissolving out of the rock by water. A noted cave was Spook Hole, about 4½ miles south of Poughkeepsie. This cave was discovered over 100 years ago. It was hundreds of feet long but is now practically obliterated through the operations of the New York Trap Rock Co. The huge quarry they developed there cut through the cave and five years ago only the end of it, 50 feet above the quarry floor, was all that was visible.

Mather[1], who wrote a most interesting report on the geology of the Hudson Valley said this about the cave: "Spook Hole, near Barnegat (now Stoneco), Dutchess Co., is a small cave in limestone and is said to have so much carbonic acid gas in it as to make it dangerous to enter without precaution. Lights burnt well at the time of my visit. I saw nothing of particular interest. It is about ½ mile southeast of Barnegat and 50 to 70 rods from the Hudson River."

A cave in limestone, immense or restricted in area, according to the one telling you about it, is said to exist at Verplanck's Point, the opening being on the east shore edge of the Hudson River. Although the writer was guided to the area where the opening should be, by an old gentlemen who said he heard where it was when he was a boy, no trace of it could be found. It is thought that the cave opening may be visible only at extreme low tide. Tradition has evidently grown with the years. The best and most intriguing is that the cave is vast, extends under Verplanck's Point and comes out elsewhere, but the exact lo-

1 Mather, Wm. W. "Geology of New York—Part 1". Albany, 1843, p. 110.

cation of "elsewhere" is uncertain. Also that it was known by the Indians or to the early settlers; was used for a hide-out by smugglers, and horses bones have been seen on the floor by those who had the timerity to explore it. Here is an opportunity for those sufficiently daring who would like to embark upon a wild adventure. However, we would not encourage it for the cave may be only a myth, or a shallow cavern worn in the rocks by the action of the tides, and really not worth seeing if found.

The third type of cave occurs in the norite of the Cortlandtown series of rocks and is formed by the dissolving out of some mineral leaving behind holes and pockets which vary from tiny ones up to five feet or more in diameter. These are known as dissolution holes. Such a cave is found in the Depew Woods, about a mile south of Peekskill, and its size is 8x2x6 feet high. On the top surface of the rock enclosing the cave some very thin joints are visible in which very tiny trees are growing. On Sun., Sept. 9, 1934, these joints and trees were carefully measured and then plotted on drawing paper with the thought in mind that ten years later the cave would be revisited and the measurements retaken to determine how much the trees grew and how large the joints had become.

The fourth type of cave is that formed when a rock mass has been split and its smaller part moved a few feet to leave an opening between joints. This is the rarest of the caves in the Hudson Valley and only one is known to the writer. This is in the historic little hamlet of Revolutionary fame, Continentalville, about three miles north of Peekskill. From the outside, one would never suspect that the solid appearing exposed pegmatite, with a glacial surface, outcropping on a hillside, would contain any opening and least of all the opening to a cave. But two small openings are present

Pegmatite outcrop in Continentalville, N. Y., which contains the cave. One of the cave entrances is near the top and center of photo. The large opening at bottom goes in but 3 or 4 feet.

Photo by Allson Albee

and after a tight squeeze—one must crawl on his stomach for about five feet—a long, narrow, winding room in entered which is 55 feet in length, 3 feet in width and averages 7 feet in height. One can tell that the cave was formed by the shifting of the left wall because—the room has three sharp bends and both the bottom and top rocks follow these bends regularly and both are parallel and both are pegmatites. In other words, if it were possible to lift the left rock wall and push it against the right wall, they would fit perfectly. The top and bottom rock walls are almost vertical; broken up rocks, however, are wedged in at the top of the room.

FABRICATION OF COPPER DEPICTED IN NEW MOTION PICTURE FILM.

The story of the production and uses of the important industrial metal, copper, as told by an interesting and informative series of motion pictures, circulated by the Bureau of Mines, has been completed by an addition of a film depicting the processes employed in making copper wire and cable and other products. The film, entitled "Fabrication of Copper," is of the silent type and consists of three reels. It was produced in cooperation with one of the larger mining companies.

The opening scenes begin with the transportation of copper in the form of wire bars from the refinery to the rolling mill, where they are heated and passed through the roughing and continuous mills, reducing the diameter to ¼-inch and elongating to 1,200 feet. The resulting rods of copper are conveyed to pickling tubs, tested for ductibility, and cold drawn to wire, the ends of which are electric-welded to maintain continuous operation, then tested for tensile strength and conductivity. These wires are made into stranded wire cables or wires 3,000 miles long and finer than a human hair. Further scenes picture the insulation of round and flat wires with enamel, paper, and cotton covering.

Reel 2 shows braided cotton being impregnated with air-blown petroleum asphalt and coated with pitch; tinning copper wire; testing, weighing and mixing materials that form rubber compound; rolling, cutting; and winding in coils; insulating with rubber; and vulcanizing. It shows vulcanied insulation being covered with cotton braid saturated with asphaltic compound; sheathing insulated cables with bronze, steel or other metallic braid; testing rubber-covered cable for dielectric strength and insulation resistance by submergence in water. It explains in detail the making of paper-insulated cable which is standard for underground transmission.

Reel 3 describes the making and operation of oil-filled cable used for transmission at very high voltages. It shows the use of copper in making pipe, tubing, and copper-base alloys; melting in electric furnaces, casting in iron moulds, the resulting billets being cut to length for fabrication into tube or rod. It depicts fabrication in a huge press where 5,000,000 pounds of pressure is applied to hot-forge, pierce, and extrude them, and, by means of animated drawings, explains the action which takes place in the extrusion press. The forming of copper and softer alloys into base tubing in a piercing machine is depicted; also the testing of tubing with air and water under high pressure; cold-rolling rods and rectangular bars in a heavy flat tandem mill; the testing of free-cutting brass, and drawing to specified temper and gauges; straightening rods and cutting to exact length; making rods and tubing in a variety of sizes and shapes. The reel closes with scenes showing research and scientific studies in the laboratory.

Copies of this film, in both 16-mm. and 35-mm. size, may be had for exhibition by schools, churches, colleges, civic and business organizations, and others interested. Applications for the film should be addressed to the Bureau of Mines Experiment Station, 4800 Forbes Street, Pittsburgh, Pa., and should state the width of the film desired. No charge is made for the use of the film, although the exhibitor is expected to pay transportation charges.

We believe that mineral specimens as a whole are priced too low. They should command at least five times the prices asked for them.

STIBNITE ONCE KNOWN AS ALCOHOL

Several *solid chunks* of what was formerly known as alcohol are now on exhibition in the department of geology of Field Museum of Natural History, Chicago, Illinois.

With the placing of this material on display, it was pointed out by L. Bryant Mather, Jr., assistant curator of mineralogy, that the name "alcohol" was once properly used only for a species of mineral.

"When the word came to Europe in the sixteenth century, from the Arabic, 'alcohol' was a mineral name," said Mr. Mather recently. "However, since this name has been usurped by the familiar liquid, the mineral 'alcohol' is now designated as 'stibnite.'

"This mineral, long known, has been used as a cosmetic since ancient times. Among the Greeks it was known by a name derived from the words meaning 'wide' and 'eye,' since the powdered mineral was used to increase the apparent size of the eye. Among the Arabs it was known as *kohl*, from *kahala*, meaning to color or to stain. In the theatrical profession the black powder used for blackening the eyelids is still called *kohl*, perhaps the only vestige in contemporary language of the original Arabic usage. The earliest use of the word *al-kohl* (*kohl* with the definite article *al*) seems to have been in 1623 by Minsheu, who wrote: "Alcohol is a drug, sometimes called antimonium, used to color the eyebrows." Francis Bacon in 1626 wrote: "The Turkes have a Black Powder, made from a Mineral called Alcohole, which, with a fine long pencil they lay under the Eyelids." Thus, as a mineral name, the word alcohol was introduced into Europe.

"Before the science of mineralogy, and its nomenclature, became systematized, the word had changed in meaning and, in effect, the mineral had lost its name. Alcohol became a general term for all sublimed powders and later for all distillates. In these stages of the evolution of the word we find phrases such as 'alcohol of sulphur' and 'alcohol of wine' being used for sublimates and distillates. In the last century the use of the word has been again restricted by chemists, not to a mineral species, but to a class of organic compounds containing the *hydroxyl group*. The best known of these compounds are methyl (wood) alcohol and ethyl (grain) alcohol."

HUGE PEGMATITE DIKE NEAR PEEKSKILL

A pegmatite dike 1,000 ft. in length which for half its distance is 80 ft. in width, narrowing down to 20 ft. at its northern extremity and which varies from 5 to 35 ft. in height, occurs about 8 miles north of Peekskill, N. Y.

The dike, whose trend is approximate north-south, is glaciated for almost its entire length and width. Even the adjacent mica schist, which borders the dike on the west, is glaciated and the contact between the two rock formations is distinct and well defined for some distance.

The dike, as exposed, is unusually pure, consisting almost entirely of pinkish microcline. A little milky quartz and epidote and a very small amount of magnetite are the chief impurities present.

The dike is ideally situated from a quarry point of view as one extremity is but 50 ft. away from the main line of the New York Central Railroad. Furthermore, due to glaciation, there is very little soil to be removed.

A HOME MADE MINERAL CABINET

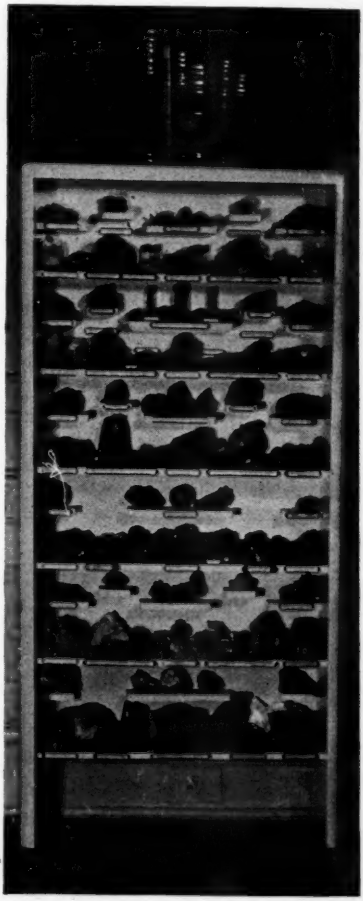
By ARTHUR H. JONES
Brooklyn, N. Y.

I have seen many cabinets for minerals all of which appeared to me to be bulky, ill fitting and clumsy looking containers. The minerals they contained were hidden from view in drawers, instead of being displayed to show their full beauty and decorative value. These cabinets invariably occupied a lot of space, appeared awkward and out of place with their surroundings; or else were hidden away in some spare room, a dark and dusty cellar or attic. To the writer's mind this seemed to be a neglectful waste of natural beauty which one could enjoy more keenly were the minerals displayed to view in a cabinet designed to show, rather than hide the colorful display they create.

Being unable to purchase a cabinet of this type, the writer designed and built one that would do just this, showing every specimen to its greatest advantage as can be seen in the accompanying photograph. I have found a greater satisfaction and enjoyment from my collection since displaying it in this manner. Have also received many compliments from mineral collectors as well as from others who were never interested in minerals, I have decided, therefore, to pass my idea along to the members of Rocks and Minerals Association so that they may know how to build a similar cabinet.

A study of the photograph will give a good idea of the finished cabinet (with the exception of the door, which is to be added later).

The cabinet is 24x48x7 inches inside, altho it was later found that 30x48x8 inches would have been better because of the additional space. The sides and top are of 1⅛x7 inch clear pine. The back, one piece ¼ inch laminated wood. The six main shelves ½x6x24½ inches and the smaller shelves 2x2, 2x3, 2x5 and 2x8 inches. These smaller shelves give



The finished cabinet showing part of the author's collection.

added room and at the same time make excellent mountings for one or two or individual specimens. Since the picture was made additional small shelves were added to sections four and six so that all sections are uniform in regard to the number of shelves.

The minerals have been arranged in the cabinet in the following manner:

Top section: Quartz minerals are displayed.

Second section: Garnets, beryl, agates and like minerals.

Third section: Metallic minerals.

Fourth section: Marcasite, pyrites, chalcopyrites, etc.

Fifth section: Calcites, prehnites, stilbites, pectolites, etc.

Sixth section: Petrified, agatized, opalized and fossil woods.

Metal name plates are placed at the front edge of the shelves giving the name and location of the minerals so that anyone may know at a glance what kind of mineral they are looking at. On the top of the cabinet there are two large specimens of petrified wood, soapstone bookends and books on mineralogy making the cabinet complete, the whole making a decidedly attractive addition to the room.

The writer will be glad to furnish more complete information to any member of the Rocks and Minerals Association desiring to build a cabinet like this one. Just write to me in care of the Association.

INTERESTING MINERALS FOUND IN MANCHESTER, NEW HAMPSHIRE

In a road cut near the site of a new armory on Canal Street, near Amoskeag Falls, Manchester, N. H.., a number of interesting minerals have been found which have created considerable interest. The find was made during the latter part of March, 1939, by Edward Warren, a senior in one of Manchester's high schools.

The minerals occur in a vein of vesuvianite, in granite, which is unusual in New Hampshire. Specimens were sent to the geology department, University of New Hampshire, at Durham, and one of the professors made a special visit to the locality to examine the occurrence and to collect additional specimens. It was his visit and determination of the minerals found which prove that the occurrence is of more than passing interest.

Manchester is the state's largest city (pop. 76,000) . A number of members of the Rocks and Minerals Association, of which Mrs. Daisy F. Hopkins is one, reside in Manchester. It was she who interested young Warren in minerals which resulted in the discovery of the above vein, and it was she who notified the University. Thus it is through the interest and influence of Mrs. Hopkins, that an unusual vein of interesting minerals has been discovered, recorded, and specimens collected before they had been covered up as road fill.

Among the minerals associated with the vein of brown vesuvianite were beryl, epidote, garnet (grossularite), meionite, and pyroxene (diopside).

Winter is the time when mineral collections get a thorough going over. Dusty specimens get washed; worn out labels are replaced while diaries are checked. Be sure that your collection is not neglected this winter.

PITCHBLENDE NEAR PEEKSKILL, N. Y.

By PETER ZODAC
Editor, ROCKS AND MINERALS

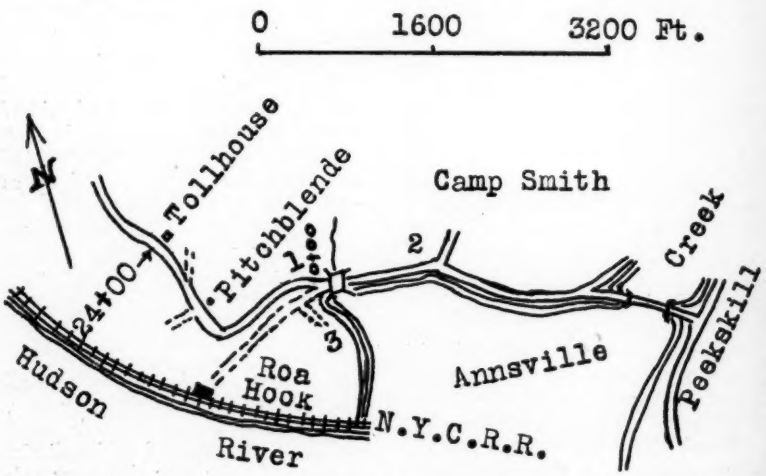
During 1924, when the Bear Mountain Bridge Road was being built through virgin territory in the extreme northwestern part of Westchester County, a new locality for molybdenite was found and specimens distributed throughout the country. One of these specimens, some years later, was sent to Geo. Gehman, who then resided in Bethlehem, Penn., but now in New York City. In examining his specimen, Mr. Gehman detected some tiny black grains embedded in it which aroused in him considerable interest. Through blowpipe and other tests, he determined the grains to be pitchblende, the chief ore of radium.

The pitchblende, associated with molybdenite, occurs in gray granite which outcrops in thin dikes with gray gneiss around Sta. 16+00[1] and through which the road passes, about ¾ of a mile northwest of the northern boundary of Peekskill. The locality is furthermore about 800 ft. south of the south tollhouse on the Bear Mountain Bridge Road.

Specimens of the granite, which often contain molybdenite, should not be too difficult to obtain, even though the terrain is overgrown with weeds and bushes, as fragments and small pieces are scattered around a large gray granite boulder which is directly opposite a private road leading to Oldstone, the estate of Collin Kemper, Esq. The boulder is not more than about 25 ft. east of the road which on the sketch map is indicated by a black dot. No doubt some of these specimens, if closely examined, might show pitchblende.

The gneiss begins its outcrop near this boulder, runs obliquely 50 ft. towards the road and then borders the

1 Sta. 16+00 (an engineering term) is a point 1600 feet from the beginning of the road considered as 0+00.



Sketch showing location of pitchblende occurrence on Bear Mountain Bridge Road.

road for about 75 ft. The gneiss is greatly in excess of the granite.

There are four localities in the nearby area, easy to reach, that may be worth visiting although one of them is practically obliterated. These are marked on the map as 1, 2, and 3.

1. Couch Gneiss Quarry. This is a very small quarry that has been abandoned for years. It is situated at the base of the hill, about 200 ft. north of the Bear Mountain Bridge Road; an overgrown path leads to it which starts near the end of the railing. Good specimens of colored banded gneiss are about all that is obtainable.

2. This is the site of a large clay and sand bank that formerly bordered the west edge of Camp Smith Road. It was opened up about 1928 by the County for grading the adjacent concrete highway but Camp Smith removed its main bulk for filling in the bordering swamp. In the clay and sand, three types of boulders were uncovered which yielded some interesting minerals. The boulders were green hornblende gneiss, pinkish granite, and crystalline white limestone.

This locality is practically obliterated although some fragments of boulders may with search be found. Camp Smith is the State's National Guard Encampment.

3. Sand and Gravel Pit (abandoned). Very fine pebbles and small boulders of basanite, epidote, jasper, milky quart and other minerals occur here. Perhaps the most interesting of all specimens are small sandstone boulders, gray in color with white calcite veins that show faulting. Very good specimens of these faulted boulders have been found.

Another nearby locality which has been overlooked on the sketch map is the railroad cut about 500 ft. northwest of the Military Railroad Station at Roa Hook. Interesting specimens of soot-coated selenites fill small cavities and hollows of the rocks along the west and near the north end of the cut. This locality has been described in an early issue of this magazine.[2]

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2 *Soot-coated selenite from Roa Hook.* By Peter Zodac. ROCKS AND MINERALS, April, 1938, p. 106.

CLUB PRESENTS DINOSAUR TO MUSEUM

Stegosaurus, a dinosaur which roamed over Colorado 150 million years ago, and whose fossil bones were found in Garden Park, near Canon City, Colo., by F. C. Kessler, is now on exhibition in the Colorado Museum of Natural History, Denver, Colo.

The remains were found in the lower Cretaceous, known as the Morrison formation, embedded in a sandy limestone shale. It took about a year to complete the excavation as the fossil, encased in a flint-like matrix, had to be chiseled out from the rock, bone by bone. The removal from the mountain down to the highway was exceedingly strenuous because it had to be carried by mere manpower in chunks weighing as much as 500 lbs. each.

"The fossil is remarkable," stated Frank M. Bailey, director of the Museum, "for its armored back and spiny tail. Being a slow-moving lizard, possibly resembling a gigantic horned-toad, it used the bony plates and heavy spikes for protection. Its head was extremely small, encasing a brain of like proportion."

The huge fossil was excavated by members of the Canon City Geology Club, of which Mr. Kessler is Secretary, and presented to the Colorado Museum where it has been reassembled and is now on display in the fossil hall.

COLLECTING IN A CAVE

By VERNE C. WHEELER

On Sunday, September 11, 1938, a party of five collectors left Roswell, New Mexico, at 7:00 a.m. for a cave near Fort Stanton, New Mexico, where some unique selenite crystals had recently been found. Those in the party were Fred Miles, Ralph Thornton, the writer and the writer's young daughters, Jewell and Laura, ages 12 and 11 respectfully. All were residents of Roswell.

We left Roswell on paved highway 70 and 380, heading west. The mountains in the distance, our destination, seemed only 25 miles away. The actual distance was 90 miles. The route traversed long, rolling hills that were covered with grass and flowers due to recent rains. Jack-rabbits and cottontails, first on one side of the road, then on the other, were common sights while now and then sharp eyes would detect an antelope in the distance. We did detect several of them, but though we had a gun with us the antelope season was not opened yet.

More hills and prairies were met and passed. When the Picacho Hill was reached we descended into Hondo Valley where orchards, hay farms and cabbage patches were galore. We passed thru the towns of Picacho, Tinnie and Hondo. At Hondo the paved road ends and we take highway 380, which turns right (good gravel road) for the historic old town of Lincoln where stands the old jail and the famous court house of the Lincoln County War while on the right stands the El Torreon Tower, another noted land mark. Going off the gravel road and towards Capitan we crossed the Rio Bonito, a small stream about 300 feet in width. Near the bridge is a sign, on the right, directing one to Fort Stanton. We made a left turn here and reached the Fort which is really a U. S. Marine Hospital. At the Fort we turned left again at a filling station, went about one block, and made another left turn between a work shop and a garage. We went past a coal pile, through a red wood gate and into a pasture (please close the gate). The road to the pasture is a one way thoroughfare in fair weather but when it rains it is no road at all. We went through another red gate, up a hill and then down a long incline where we took the right fork which led down a steep hill at the bottom of which was a large opening. This is the entrance to the cave.

The hills around the cave are covered with cedars. There is no drinking water around the cave so we were prepared for this emergency by having a canteen full with us.

(The credit for the knowledge of the Selenite occurrence goes to Fred Miles who in turn learned of the occurrence from a friend, Chauncey Aldridge of Capitan. The previous Sunday Aldridge, Thornton, a fellow by the name of Johnny and the writer had visited the cave.)

We had a gasoline lantern, three flash lights and an electric lantern, some light rope, matches, shoes that were well broken in (with rubber soles), gloves and tough breeches as there is some crawling to be done; also boxes with saw dust in which the very fragile crystals are to be carried out. The crystals are very delicate, one falls often and sometimes hard so that the selenite may be easily damaged if not well protected. In addition we had some newspapers in which to

wrap stalactites that we intended to bring out.

O. K. lets go. A good jaunt for you if you are not short winded, not afraid to get dirty and have plenty of nerve to stay with the party.

We are in. Ralph is in the lead with the flashlight. Fred is next with the electric lantern, the writer is third with the gasoline lantern and the girls in the rear each carrying a box of saw-dust. The air is very cool and we can easily see our breath. Going in every-one is happy and raring to go, down over rocks, dirt and other obstruc-tions. It gets dark quickly and dense-ly. The gasoline lantern starts flick-ering. It sure is dark! We had not gone far when one of the girls said, "Oh Daddy, there's a bat" and the other, "Oh gosh, I wish I had not come" as we reached a place we must crawl through.

How much further? Just getting started. Starting to get wet too. The floor is covered with clay. Can not see well. Many rocks. Trail is get-ting slippery. Fred stepped into a puddle of water, "Say, this water must be around zero," he yells. We cross a small stream flowing in the direction we are going. The walking is easier as the floor is almost level. We re-member to observe various formations so that we may find our way out again. We keep on going, we have been on the march nearly an hour since we en-tered the cave. We come to a spot that has a long slippery slope. The rock walls are white at this particular place. We climb this slope trying hard not to roll back down. A small hole here turns off to the right while the main cave goes on but how far or where we do not know. A stream of water runs down it. We have been walking upright but here is where we must stoop and very low as we soon found out.

We drop to our knees and start crawling through this very small hole on the right. This requires acrobatic ability as you have to crawl through the hole and carry a gas lamp at the same time. It sure is hot! I mean the lantern. Soon we reached a large room 15 or 20 feet across, hundreds of feet long, but whose ceiling is only three feet high. Little stalactites about 1 inch long hang down from the ceil-ing. My head cracks one. Gee, do not need a lantern now! Plenty of stars shooting around! Crawling through this room is better than try-ing to walk like a duck, as I had been doing. I cuss a little under my breath and I'm sweating like a steevedore. Ralph is tall, about 6-3, Fred and I are each 6 feet. We have a good rock floor to crawl on but Ralph soon hol-lars, "Say, I need some knee pads. These little rock icicles are going through my bones." The floor is cov-ered with these small stalagmites which roll around under our knees as we crawl. We keep on crawling. Hav-ing already crawled about a quarter of a mile, we look up. There, something surely is sparkling just like diamonds! On each side of the passage is a soft clay or dirt mass under ledges which are 6 inches to a foot high. Out of these soft masses slender selenite crys-tals from 1 inch to 6 inches in length grow straight upwards, resembling a miniature forest of glassy needles. These needles are sometimes clear white, some patches are of a dirty red, others are brown. The further back under the ledges the better are the crystals. Fred has some mechanical fingers or forceps which we use to great advantage in extracting crystals which were out of our reach. We unpack our saw-dust boxes, fill them

with crystals and set them to one side to be picked up on our return. We had been walking and crawling for two hours in the cave so we sat down to rest, turned out the lights, and talked in the darkness for a time.

After a brief rest the lights were again turned on and we proceeded to crawl further. Selenite crystals continued along the sides of the passage. The girls asked, "Daddy, are we going to crawl all day?" About 300 yards from our resting place we could stand up. Then again we began to crawl but not for very long as we soon came into a large room. Many stalactites, some black and others white, were suspended from the ceiling while the floor was covered with cave onyx. Water dripped everywhere. We crossed this room and went up a steep incline covered with onyx. Our feet are wet and having clay on them the onyx incline was as slippery as glass. Look out we need that flash light! We obtained some black stalactites from 3 to 8 inches long from the handiest places as the ceiling is over 20 feet high.

We continued our journey. Soon we came to another tight place. "Oh Daddy, how are we going to get down there?" wailed one of the girls as we came to a slippery slope which led at least 20 feet to the bottom of a pit. Ralph goes down first and then the girls. Fred had no sooner made the request to go next then his feet went from under him like chain lightning and he rolled all the way to the bottom. Fortunately he was not hurt. Across this hole we went and up the other side which was likewise smooth and slippery. Suddenly we stopped, confused, puzzled. The surroundings were unfamiliar. This does not seem to be as it had been the previous Sunday. "Daddy, are we lost? Let's go back out," cried the girls. Fred alone seemed undisturbed. He saw some nice black stalactites up under a ledge and went to get them. He is too big to get thru so Jewell goes to his assistance and she gets them for him. Ralph decides he wants some stalactites also and crawls to the ledge to get them. In trying to return he gets into difficulty. With his flashlight in one hand and holding the rocks in the other he started backing over the ledge. Soon he is hanging over it up to his waist. "Say, Verne, how far off the floor am I," he yelled to me. "Wait a minute and I'll see," I answered. Then swinging the light over the side I continued, "You better hang on a while longer as it is about 30 feet to the bottom." The rocks and flash light were laid down without any ceremony.

We were in the wrong place all right but further investigation put us on the right track again.

Our journey took us through more holes, over rocks of all sizes and through a room 40 feet across, 20 or 30 feet high and hundreds of feet long. Everything was wet. The stalactites had a drop of water on the bottom of each one. The girls sure did open their eyes here as the stalactites were a burnt orange in color and from 1 to 2 feet in length. The stalagmites which were also present were domes of various sizes from 1 to 6 inches in diameter by one to 8 inches high and all of a burnt orange color. The rocks were covered with the same material which I have called cave onyx, some in ribbons, some flat. After securing enough specimens of various kinds we began to pack them up. We had about 75 pounds in each sack. By the by—we left our lunch in the car and likewise forgot to bring any water in with us. Because of the latter omission we drank some drip water; it did not hurt us and besides

we needed some iron in our system.

We then proceeded to retrace our journey. Soon the gas lantern went to sleep and no amount of coaxing would awaken it. It was darker than ever before though we did change the flash light batteries but they were weak compared with the lantern.

Coming down one of those slippery holes when I was carrying the sack they asked me if I could manage it all right. "Sure," I said but about half way down the seat of my pants hooked on a knob and there I hung head down and both hands full. I managed to break loose with only a skinned knee as a reminder of the predicament. Back over the same trail we went, through the long passage where we had to crawl and by this time we were getting very tired. We reached the selenite locality, collected a few more specimens and picked up the boxes we had left there. Then on we crawled, knees very sore but with a sack full of minerals to carry conditions were even worse. First one would carry the sack, then another. Say, nobody with a sane mind would be a rock collector! This sack weighs about 200 pounds! Try crawling and carrying a sack full of specimens, a dead gas lantern, a flashlight which is no better than a candle and you will understand my own plight.

When it was my turn again to carry the sack, the girls and I started on ahead. Laura had the candle-size flashlight and Jewell had a stalagmite. We came to the place where it was necessary to crawl under the ledge. Under we went and finally immerged in the large room. Just as the girls said, "This is the way to go around the bend in the trail," the flashlight went out completely. In the pitch darkness we became hopelessly lost. The girls became frightened. It would have been foolish to continue without a light so we sat down and waited for our party to reach us. Soon a light was seen and then Ralph and Fred made their appearance.

Down the steep clay slide we went although Fred and Laura both rolled down. Everyone was wet with perspiration but we soon reached a spot where there was a little draft which helped to cool us off. It was quite a struggle coming out of the cave as we were tired out, loaded down with specimens and had had nothing to eat. When we reached the flowing stream we waded through like ducks, a little more water wouldn't hurt us. It might actually take off some of the clay from our feet. The big flashlight was failing fast and at several places in the cave there are blind end trails which are some times ¼ mile long. It was a good thing that we had spotted various formations to find our way out. We had more rocks to crawl over when suddenly one of the girls called out, "Oh, Daddy, I see daylight, let's hurry."

There was not much hurry left in anyone by that time but we hustled to the best of our ability. When we got to the entrance we found it was raining in torrents. One of us walked to the car for the lunches which we ate in the cave a few feet from the entrance. It was 3:45 p.m. when we reached the cave entrance. It had been 9:30 a.m. when we entered it. After lunch we loaded up the car and started for home.

The trail road from the cave through the pasture was now a river road, water rushing down both tracks. The mountain dirt was very slippery and we had no chains (there was not even a cloud in the sky when we left that morning). Fred and Ralph pushed and shoved. Just two more miles, two more slippery hills, raining all the time!

After much tugging, pushing, and getting wet through and through, we were mighty glad to leave the wet, sticky mud behind and to get on the gravel road at Fort Stanton. From there our road worries were over and we reached home without any delay or trouble.

EDITOR'S NOTE:—The selenites mentioned in this article are of an unusual type for the mineral. The crystals vary up to 5 or 6 inches or more in length and are very slender—resembling darning needles. Crystals of this form are known as "darning needle crystals."

A Collector Shows His Credentials

(Continued from page 334)

was handed to the clerk with the statement, "Perhaps this may help us out." The clerk looked at the card, then at Mr. Ryan, and rising, excused himself for a minute while he went into an inner office. In a short time he was back and said: "Be here at 1:00 p.m., and a guide will show you around."

At 1:00 p.m., the Ryans were back in the office where a guide was awaiting them and with the promise that they would not touch any rocks or minerals on the tour, they started off. They were taken to all the important plant buildings, to the shafts, tunnels and dumps, with the guide explaining the various methods of working or giving many bits of information on other matters. Mr. Ryan was even taken into the mine (Mrs. Ryan was not permitted to enter as miners are very superstitious about allowing a woman in a mine—she would not have gone even if allowed). All in all the Ryans had a most enjoyable and interesting trip and when it was all over and they were back in the office again, preparing to leave, they were presented, to their great amazement and joy, with a big bagful of very fine mineral specimens.

The moral of this story is that officials at mines and quarries in general do not refuse permission to visitors to enter upon their property just to be mean and disagreeable. Their operations are business enterprises which are in many respects hazardous and even dangerous.

Consequently they do not want mere curiosity seekers to roam over their property. But when an individual is a member of the Rocks and Minerals Association, the world's largest mineralogical society, he is an individual of some standing and respect and is shown every courtesy possible.

Peter Zodac

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ROCKS AND MINERALS PEEKSKILL, N. Y.

. . Collectors' Tales . .

By PETER ZODAC

"It Cannot Happen Here."

Some months ago I was a member of a hiking party led by A. Stanley Conyes, a member from Ossining, N. Y. Our route went through Hell Hollow, in northwestern Putnam County, N. Y., where the sunlight is said never to enter. Then we went on and on over mountains, higher mountains, and very rugged higher mountains. I will not dwell on the hike because as a hiker I was completely outc'assed.

Before we started, I happened to find three or four very small pieces of cacoxenite (a golden colored mineral in limonite) in my mineral bag left over from the day I visited the locality near Hellertown, Penn. Because of their bright golden color, which seemed to fascinate Mr. Conyes, the specimens were given to him.

On the return home, Mr. Conyes drove us to a miniature "canyon", also in Putnam County, never before seen by the rest of us. Here we found two young couples swimming in one of the pools in the gorge.

Out of curiosity we all got out of the car and proceeded to examine the rocks in the gorge. We soon found some large boulders with small cavities encrusted with drusy quartz which we broke up with the hope that something interesting might be inside. Our efforts were in vain as nothing was found. Unware that the swimmers had stopped their activities and were watching us, three of us kept pounding away but soon gave it up in disgust, scrambled lazily up the side and strolled on to the car.

The fourth, Mr. Conyes,, who in his examination had wandered on up to the swimmers, was soon surrounded by them and one of the girls wanted to know what we were doing.

"Oh, they are looking for gold," said Mr. Conyes not realizing what he was saying.

"Gold!" excitedly echoed the swimmers. "Do you mean to say they found gold here?

"Why, yes," replied Mr. Conyes, suddenly coming to, and then happening to recall the cacoxenites in his pocket, he fished them out and held them in his hand. "See, here is what I found!"

"It is gold! See how yellow it is!" said one of the young men breathlessly and then all gazed at the specimens with their mouths wide open. In the ensuing silence, Mr. Conyes nonchalantly walked on to join us. It was not until we were out of sight of the gorge that Mr. Conyes divilged the joke he had played and we all had a good laugh.

We hoped, however, they would preserve their energies for swimming in the pool rather then expend them upon the rocks of the gorge about it seeking for treasure which did not exist there.

A poor specimen, fully labelled, receives more attention than a good specimen, poorly labelled.

WITH OUR MEMBERS

Some very enthusiastic comments have reached us regarding the large array of magnificent North Carolina minerals in the collection of Jno. L. Beal, of Gastonia, N. C. His name and address is now on our "Must See" itinerary and we hope to visit him some day in the near future and see his collection.

Now that winter is in the offing many of our members will be heading for Florida. The first one to write in to have his magazine readdressed is Dr. Harvey P. Barret, of Charlotte, N. C., who will sojourn in Clearwater, Fla.

C. C. Warren, of Villa Park, Ill., recently made a tour of some New England localities. The pegmatite quarries of Maine fascinated him so much that he plans to revisit them at his first opportunity.

John T. Sinclair, Jr., of Ridgewood, N. J., a recent graduate of Wesleyan University, is now connected with the Tide Water Associated Oil Co., of Los Angeles, Calif.

A very nice write-up—"Ralph Colcord Publishes Work on Mineralogy of Ancient Rome"—appeared in the Sept. 29, 1939, issue of the *Claremont (Calif.)* Courier. The write-up, which ocupied two columns, each about ½ page in length, dealt with Mr. Colcord's scholarly article on "Notes on the Life of Pliny the Elder and his Minerals" which appeared in the Aug., 1939, issue of *Rocks and Minerals*.

C. P. Butler, whose article "A Problem in Finding Meteorities" appeared in the June, 1939, issue of *Rocks and Minerals*, and which created considerable interest, has been transferred from Calama, Chile, to Swarthout, Calif. Mr. Butler, an astronomer for the Smithsonian Institution, will be Director of the Table Mountain Observatory, in Swarthout.

George A. Wilson, of Quincy, Mass., Nova Scotia, Canada, and who is familiar who has been spending many summers in with the best zeolite localities of the province, reports that the main roads in Nova Scotia are now paved. No more dust! No more construction!

O. Ivan Lee, of Jersey City, N. J., spent two weeks in August at his old camping grounds—the pegmatite mines around Spruce Pine, N. C. Here he not only collected some unusually interesting minerals but also some fine colored photographs of the localities.

CLUB AND SOCIETY NOTES

New Haven Mineral Club

Arthur Montgomery will be the guest speaker at the Club's meeting on Monday, Nov.. 13th, 1939. His subject will be: "Gem Collecting on Mt. Antero", illustrated by slides. A large turnout of members and guests is expected as Mr. Montgomery is a very popular speaker. He has, furthermore, endeared himself to the club members through contributions of splendid specimens as prizes.

Plainfield Mineralogical Society

A two day field trip to the Strickland and neighboring quarries, near Portland, Conn., was held Oct. 7th and 8th. Though the Strickland quarry has been shut down for some time and good specimens are conspicuous by their absence, the adjacent Schoonmaker quarry (mine) furnished many fine specimens of beryl, tourmaline, lepidolite, albite and other minerals.

Federation Bulletin Increases In Size.

Under the editorship of Paul VanderEike, *Mineral Notes and News*, the official bulletin of the California Federation of Mineralogical Societies, has been increased from two to three pages. Many interesting items are featured in the October issue and indications are that future issues will be even larger and more interesting.

BIBLIOGRAPHICAL NOTES

FIRST AID TO FOSSILS
Or What to Do Before the Paleontologist Comes

By JOHN E. ALLEN

Oregon Dept. Geol. and Mineral Industries, Bull. 18, 28 pp. lithoprinted), 1939.

This unusual and interesting publication should be of interest to all collectors but especially to those interested in fossils of any kind. It contains chapters on these topics: What are fossils? how to go about it; shell fish and other spineless creatures; bones, from mouse to mammoth; leaves and other parts of plants; microscopic animals and plants; and the home laboratory and museums. An appendix on "Don't for Diggers" is useful.

After reading this publication the collector should know how fossils are formed, where they are found, how to collect them, and how to display them in his collection.

This publication is obtainable from the Oregon Department of Geology and Mineral Industries, 329 SW Oak Street, Portlan, Oregon, at a nominal cost of 20 cents.

Report of the Committee on the Measurement of Geologic Time—1938-1939: Presented at the Annual Meeting of the Division of Geology and Geography, National Research Council, April 29, 1939.

The greatest progress made in this field during the past year is credited to A. O. Nier, in his mass-spectrographic studies on leads of known radiogenic origin and on uranium. The works of many other investigators are also given due credit.

Issued by the National Research Council, 2101 Constitution Ave., Washington. D.C., September, 1939, 114 pp.

Mineral Resources of Georgia. Georgia, the largest state east of the Mississippi River, with rock formations ranging in age from the most ancient to the youngest, is endowed with mineral resources in great variety and in almost unlimited quantities. More than 35 different rocks, minerals, and ores are either being quarried or mined or have commercial possibilities.

Issued by the Division of Mines, Mining and Geology, State Capitol, Atlantic, Ga., 104 pp. 32 illus.

Fluorescent Minerals. By W. Scott Lewis, 15 pp.

An interesting publication by one of America's outstanding mineralogists. The booklet explains the phenomena of fluorescence and phosphorescence, tells the good and bad features of various types of ultraviolet lamps, and describes many fluorescent minerals.

Copies of this interesting booklet may be obtained on remitting 15c to the author, W. Scott Lewis, 2500 N. Beachwood Dr., Hollywood, Calif.

Minerals, Rocks and Gems: Mineral List No. 401. Issued by the American Mineral Exchange, 212 Pacific Ave., Houston, Texas. 16 pp.

We are pleased to announce the issuance of this mineral price list not only because of its attractive appearance and long list of choice mineral specimens which should interest every mineral collector, but because it is an indication that mineral collecting is positively on the increase and that American Mineral Exchange, one of the country's most progressive dealers, is keeping pace with it.

Woodland Trail Walks: This is the official bulletin of the Hiking Trips Bureau, Ho-ho-kus, N. J., of which Ernest A. Dench is Director. The bulletin of 34 pages and which is priced at 10c lists a number of intersting hiking trips that will be held, generally on Sundays and around northern New Jersey and southeastern New York, from Oct. 1st, 1939 ,to March 31, 1940. As many of these trips are to areas where abandoned mines will be visited they should be of much interest to those of our readers who pride themselves upon their hiking ability.

MINERALS YEARBOOK, 1939

In "Minerals Yearbook, 1939," just published, the Bureau of Mines, Department of the Interior, Washington, D.C., presents an economic review and statistical summary of the mineral industry of the United States in 1938. The volume reviews current trends in production, consumption, prices, stocks, technologic progress, world conditions, and international trade for nearly one hundred metal and mineral commodities.

In response to the wide public interest in the problem of providing adequate supplies of minerals needed for national defense, the new Yearbook summarizes the domestic situation with respect to the more important strategic minerals that must be obtained in whole or in large part from foreign sources. Despite the costly experiences of the World War the industrial preparedness program of the United States still contains a weaknes by reason of its failure to provide adequate supplies of our deficient minerals for use in time of stress, it is noted. While the situation in some commodities has improved since 1918, it has been become more acute in others. The United States is no longer dependent on foreign sources for nitrates, potash, and platinum, for example, and domestic production of a few other commodities has been expanded. On the other hand, exhaustion of higher grade ore bodies, as in the case of mercury, and the tremendous increase in the use of such essential metals as tin, manganese, chromium, tungsten, and aluminum has increased our dependence on foreign sources of supply for these commodities.

A new chapter of the Yearbook presents a comprehensive survey of the consumption of pig iron and iron and steel scrap. This volume includes for the first time, statistics for the sales of barite, by consuming industries, and a survey of kerosene consumption.

The preliminary total value of mineral production in the United States in 1938, as reported to the Bureau of Mines by producers, was $4,354,000,000, a decrease of 20 percent from $5,413,600,000 in 1937. Metals, as a group, showed the sharpest decline—40 percent—followed by mineral fuels, with a drop of over 12 percent, and nonmetals with nearly 12 percent.

Despite drastic curtailment in production of virtually all important minerals, the record of the mineral industry in 1938 was better than that of business in general. The index of the Federal Reserve Board for minerals was 98, a drop of 15 percent from 1937, whereas the combined index for all industry was 86, a drop of 22 percent.

While the industrial recession that began the latter part of 1937 continued at an accelerated rate in the first half of 1938, substantial improvement was registered in the mineral industries during the last half of 1938. Sales increased appreciably, and prices regained most of the losses incurred during the first 6 months. At the close of the year the outlook was considerably brighter than at the begining.

Gold was outstanding among the principal minerals, in that production in 1938 increased appreciably from 1937. Aluminum output was only 2 percent below 1937, but copper, lead, and zinc dropped from a third to a fifth below 1937 levels and, largely as a result of smaller production of base metals, silver output also declined. The depressed condition of the steel industry was responsible for a drop of 61 percent in iron ore production, and most of the other minerals used in steel manufacture—fluorspar, fluxing stone, coke, and alloying metals—showed similar declines. Molybdenum was the notable exception, for production again increased in 1938 although shipments were lower than in 1937.

The relatively mild winter of 1938 as well as low industrial activity resulted in a drop of 23 percent in bituminous coal and lesser declines in output of anthracite, petroleum, and natural gas. Natural gasoline production increased slightly. The output of the building materials group—cement, stone, sand and gravel, gypsum, lime, and clay products—in general was roughly 10 percent lower in 1938 than in 1937, although total slate production was slightly higher owing to increased demand for granules. The conspicuous exception to the general downward trend of the other nonmetals was bromine, production of which again rose to a new record.

In "Minerals Yearbook, 1939," the Bureau of Mines presents a complete official record of mineral production in the United States in 1938. The volume contains 1447 pages with numerous charts and diagrams. It is distributed by the Superintendent of Documents, Government Printing Office, Washington, D. C., at a price of $2 in the United States, Canada and Mexico; $2.50 in other foreign countries.